

conditions that may be impossible. So, it is safest to be prepared to feed hay and grain if necessary.

If the forages available on sparse pastures are nonleguminous plants, low in protein, it is desirable to feed cottonseed, linseed, or soybean meal or cake. If the pasture forage is extremely scarce, it may pay to feed alfalfa, clover, soybean, or lespedeza hay. If the sparse pasture is of legumes, the grain supplement may be corn, or corn and oats in equal parts by weight. Daily allowances of feed for supplementing pastures vary with the degree of scarcity of pasture forage, but as a rule one-third to one-half pound of concentrates should be enough for a ewe or doe

as a daily allowance where the pasture forage can supply their roughage.

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THE USE OF FORAGE IN FEEDING HOGS

JOHN H. ZELLER

PORK can be produced on good, clean hog pastures with 15 to 50 percent less concentrates than dry-lot feeding requires, depending on the method of management. Good legume pastures may replace one-half the protein supplement ordinarily fed in dry-lot rations, besides minerals, vitamins, and other essential food elements. Pigs on pasture usually gain faster and reach the market several weeks earlier than pigs fed balanced rations in dry lot.

Sanitation is easier when hogs are on a rotation-pasture system, and the danger of parasitic infestation is lessened. More runty pigs are found under dry-lot feeding conditions than with pasture-fed pigs. Hogs on pasture help to maintain soil fertility by scattering the manure over the land; as much as 75 percent of the fertilizing value of feeds fed to hogs on pasture may be recovered and returned to the land. Another advantage of pastures for swine is the saving of labor.

Despite those advantages, though, it will not do to think that that is all there is to it. Hogs have a limited digestive capacity; their stomachs cannot

utilize the large amounts of forage that cattle, horses, and sheep do. Even the best pastures generally provide little more than a maintenance ration for swine—for economical production, hogs must be fed a certain amount of concentrate feed in addition to pasture. The basic point regarding the pastures is one of quality, then, not one of quantity.

I think of seven essentials of good pasture crops for swine production, regardless of locality. They must be adapted to the soil and climatic conditions under which they are grown. They must be grown at small expense. They must provide abundant growth for a short pasture period, or consistent growth over a long period. They must be palatable and succulent so as to be readily consumed, and rich in protein, vitamin, and mineral nutrients. They must have a good carrying capacity over the grazing period.

Four types of pastures are used in swine production: Permanent, rotation, and temporary pastures, and grain crops to be hogged down. Many successful hog growers combine two or

more types to furnish the maximum grazing facilities, with planned rest periods for the pastures.

Permanent pasture plants most generally used are perennials like bluegrass, white clover, Bermuda-grass, carpetgrass, and Dallisgrass. Permanent hog pastures can be utilized over a long grazing season. They usually furnish the most nutrients, though, during the spring and fall growing periods, and have a dormant period during July and August.

Rotation pastures may include alfalfa, red clover, Ladino, sweetclover, alsike, orchardgrass, bromegrass, lespedeza, and others. These pastures grow rather consistently and can be utilized at any time during the growing season until other crops are ready to graze.

The temporary or annual pastures, which are seeded each year and supplement or replace permanent pastures, fit well into a swine sanitation program. Under the McLean County system, for instance, hogs are raised on clean pastures, the land having been plowed and planted since it was used previously by hogs. Temporary pastures include crops like rape, soybeans, cowpeas, Sudangrass, rye, oats, wheat, barley, Italian ryegrass, and field peas. The rate of seeding temporary pastures should be heavier than that for grain crops so as to get a denser sod, which provides more pasture than hogs can keep closely grazed and therefore lessens the danger of parasites. Frequently the pastures, after providing succulent grazing, will produce a grain crop that can be harvested.

Hogged-down crops include corn, sorghums, sweetpotatoes, peanuts, and small grain. A good practice is to have a pasture crop in a field next to a hogging-down crop so hogs will have access to both fields. Frequently soybeans or a similar crop is seeded at the last cultivation of corn so that the two crops can be grazed in the same field.

The proper use of the different types of pastures requires careful planning so as to have the hogs on each pasture

get the most nutrients at the proper time and not handicap the carrying capacity of the pasture later.

Alfalfa makes one of the best legume pastures for swine. It is high in nutrients, provides a long grazing period, and gives an efficient substitute for the high-priced protein supplements. Alfalfa is rated 100 percent as a basis for comparison with other crops in value in pork production. If it is not grazed too closely, the crop will grow enough to be cut for hay and yield 1 or 2 tons of hay an acre in addition to the grazing.

Red clover, properly grazed, rates next to alfalfa in feeding value and economy as a forage for hogs. It is a high-yielding forage, but it should not be grazed too early in the season before growth starts. It fits well into crop rotation systems. On some soils it often excels alfalfa.

Rape, though not a legume, compares favorably in nutrients with both alfalfa and red clover. In all-around value, it is on a par with the clovers for hogs. Besides its long grazing season, it has a high carrying capacity. The Dwarf Essex variety is more palatable to hogs than other varieties. The crop may be seeded any time during the growing season; it grows quickly. It is often sown in combination with oats, barley, or oats and field peas.

Sweetclover is valuable as a soil builder and high in nutrients and is a large yielder of forage or hay. Best results are obtained when hogs graze the crop the first year, as growth in the second and third years is coarser and less palatable.

Bluegrass furnishes excellent grazing for hogs in early spring, fall, and early winter. It is a permanent grass that can be utilized on lands unfit for other crops. The crop becomes dry and unpalatable in midsummer.

Soybeans, a popular temporary crop for hogs, are planted about the time corn is planted. They furnish excellent green forage in midsummer. When the crop matures, it can be hogged down.

Oats may be seeded in early spring

for an early forage. Oats and field peas are often seeded together.

Sudangrass furnishes green grazing in the hot, dry months. The grazing period is short, but the crop has a heavy carrying capacity.

Winter rye sown early in the autumn furnishes late-fall and winter grazing. It is also a good spring grazing crop for sows and litters in the Corn Belt. The crop should be heavily grazed; otherwise it soon becomes coarse and of little value.

Mixed grass pastures are becoming popular in many districts. They make succulent forage available at almost any season, depending on the plants used. Ladino clover, a legume of high protein content, is used in many such mixtures. Alfalfa, Ladino clover, alsike, bromegrass and orchardgrass are often used in one mixture.

The research worker is always on the alert to test new pasture grasses to determine their value in livestock production. An example is the use of cheatgrass, once considered a weed, as an early-spring pasture for grazing sows and litters. The unnamed variety used at Beltsville originated from seeds collected in Maryland by Dr. W. B. Kemp, of the Maryland Agricultural Experiment Station, and developed as an excellent crop for the prevention of soil erosion. In the tests at the Agricultural Research Center, cheatgrass pasture was palatable to hogs and furnished a longer grazing period than either rye, barley, or wheat pastures.

Results of tests at various experiment stations show the value of hogging off crops. Corn, soybeans, small grains, peanuts, sweetpotatoes, sorghums, and such crops fit well into such a system. The chief advantages of the system are that it saves labor costs of harvesting the crop, increases soil fertility, aids in swine sanitation, and lowers cost of pork production. Year-round grazing systems of green and mature crops are the basis of increased hog production in Georgia, South Carolina, Florida, and other Southern States.

The use of ground legume hay or

meal in the winter ration has become an established practice in many herds. Feeding sun-cured or dehydrated hay is an excellent way to supply the nutrients found in pasturage. The dry legume forages are particularly valuable in speeding up gains in dry-lot feeding: They supply health-giving nutrients that might otherwise be lacking.

A series of experiments over 6 years at Beltsville were aimed to find out the most efficient levels at which sun-cured legume-hay meals could be fed to pigs from weaning to a market weight of 225 pounds. The hays tested were alfalfa, soybean, and sericea lespedeza. The hay meals were fed at 0-, 5-, 10-, 15-, and 20-percent levels. Somewhat more rapid gains were had on the 5- and 10-percent levels. Up to the 10-percent level the ground hay effected an appreciable saving of concentrates. Leafy soybean hay, cut in the early bloom stage, ranked ahead of No. 2 alfalfa hay; sericea lespedeza was the least valuable. Thus, we found home-grown legume crops can be utilized in swine feeding with a saving in the purchase of protein feeds needed to help balance home-grown grains.

Other tests were conducted with spring- and fall-farrowed pigs at Beltsville to compare the value of dehydrated legume hay meals in the rations of feeder pigs from weights of approximately 62 to 125 pounds. Dehydrated soybean, kudzu, sericea, and alfalfa hay meals, and a sun-cured alfalfa hay meal were fed at 10 percent of the total ration; a check group received no hay meal. The pigs fed the dehydrated alfalfa hay meal made approximately 9 percent faster gains, with a saving of 10 percent of feed over those receiving the sun-cured hay. Dehydrated kudzu and soybean meals gave results about equal to those of the sun-cured alfalfa meal. The pigs receiving the dehydrated sericea hay meal made the slowest and most expensive gain.

The value of alfalfa hay in the ration of brood sows was demonstrated by investigators at the Wisconsin Agri-

cultural Experiment Station. Sows that received only 5 percent of alfalfa hay in the ration during gestation raised only half as many pigs to weaning age as other sows that were fed 15 percent of alfalfa. The pigs from sows receiving the lower level of alfalfa hay were much lighter in weight at weaning. Growing and fattening pigs made the cheapest gains from 53 to 200 pounds in weight when alfalfa made up 10 percent and 15 percent of the ration fed in dry lot. Feed costs at the 20- and 5-percent levels were more costly per 100 pounds of gain. Many farmers, besides putting 10 or 15 percent of ground hay or meal in the mixed ration, make legume hays available in racks so that sows can eat all they want.

Young grass silage preserved with concentrated whey can be used successfully as a supplement in the winter ration of growing and fattening pigs. At Beltsville we tested the value of such silage with 4 lots of 10 pigs each. A standard ration plus supplements was fed from weights of approximately 65 to 225 pounds. One lot received ground alfalfa hay at a 5-percent level; the second lot, corn silage; the third, concentrated whey-grass silage; and the fourth, concentrated whey-grass silage and 2 pounds of concentrated whey per 100 pounds of live weight. The corn silage and whey-treated grass silage made up 13.6 percent of the ration. The pigs gained at the rate of 1.83, 1.48, 1.78, and 1.81 pounds each daily, and required 357, 422, 411, and 398 pounds of feed, respectively, on the rations in the order given.

This test demonstrates that green forage can be processed in periods of plenty and fed to advantage in off seasons to help balance the ration with home-grown feeds. It also suggests the possibilities of other ways of preparing silages for use in hog feeding.

Young grass is nature's contribution to healthy livestock nutrition. Green forage crops provide succulent grazing for brood sows during the gestation and suckling periods, as well as for growing and fattening pigs. A system of green

forage crops should be worked out that provides green grazing for hogs for as much of the year as possible.

Experimental results at the Missouri Agricultural Experiment Station show that sows fed good rations in dry lot farrowed pigs that were not so healthy or thrifty as pigs from sows fed similar rations on good pasture. A noticeable improvement in health occurred when fresh growing forage was given the unthrifty pigs. The results show the importance of pastures for brood sows.

Brood sows during the gestation period can obtain a large percentage of the nutrients needed on good pasture. The better legume swine pastures may replace most of the protein supplement and 40-50 percent of the grain concentrate for bred sows. Only about three-fourths of a pound of corn, or its equivalent, in addition to a small amount of tankage or skim milk, is needed daily per 100 pounds live weight of sow to produce one-half to 1 pound of gain per day during gestation, depending upon her condition at breeding time. Proteins of animal origin such as tankage, fish meal, or skim milk are effective in supplementing plant proteins and should be included in the rations of brood sows, even when they are on pasture.

Many swine growers have sows farrow their litters on pasture. Others farrow the litters in central houses and move them to a clean pasture in a week or 10 days. The use of good pasture simplifies feeding and helps to increase the milk flow of the sow. The most satisfactory method of feeding is to allow both the sow and pigs access to a self-feeder. Grain, a protein supplement, and a mineral mixture may be made available in separate compartments of the feeder, and the sow and litter allowed to balance their own ration. A mixed ration, balanced with respect to energy values, protein, and minerals, is often fed free choice. In addition, pigs should have access to high-protein feeds in a creep, including an animal protein feed such as tankage, fish meal, or skim milk.

The amount of grain to feed to growing and fattening pigs on pasture is important for economical production. The two methods generally used are full feeding of concentrates on pasture for early marketing, and growing on limited feeding of concentrates on pasture followed by full feeding for late marketing. The former method usually gets early spring pigs on the market during the pasture-growing season, at a good market price, ahead of the general run of hogs. There is also less labor, risk, and carrying cost. The latter method requires feeding over a longer period, more labor, and greater risks; marketing is later and at a lower price. A summary of the results of the two methods of feeding at the Indiana Agricultural Experiment Station showed that the full-feeding method returned the greater profit between feed cost and market price of hogs in 5 out of 6 years.

Hog pastures should be tightly fenced to confine pigs of all ages. The most satisfactory hog fence is wire, 39 inches high with 9 bars, 6 inches between stays, and No. 9-gauge wire throughout. Two strands of barbwire above the 39-inch fencing provides a fence to turn stock of all kinds. A strand of barbwire at ground level will keep small pigs from digging holes under the fence.

Three other points need emphasis.

A hog lives close to the ground. He has a tough snout, and it is natural for him to root, especially when the

ground is soft. Putting a ring in his snout will keep him from rooting holes or tearing up the sod. The ringing operation should be done carefully to prevent infection. Hogs that are furnished a well-balanced ration with adequate minerals are less likely to root than those on a mineral-deficient ration.

Shelter in the form of movable colony houses or open-front houses exposed to the south should be provided for protection against cold, rain, and high winds. Shade should be provided in all hog pastures if natural shade is not available. Temporary shade can be provided cheaply by using poles, brush, and straw. If shade is not furnished, hogs will root holes in the soil to obtain moist earth to cool their bodies.

Clean, fresh water is essential at all times if hogs are to gain rapidly and economically. Water may be furnished naturally by streams or springs in the pasture or be provided in water fountains or troughs. Mud wallows or ponds should be avoided. If a hog wallow is necessary for comfort, a movable wallow built on skids can be provided and dragged from pasture to pasture.

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GRASS FOR THE PRODUCTION OF BEEF

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BEEF CATTLE lead all classes of American livestock in the consumption of grass and grassland crops. They utilize about one-third of the permanent pastures, three-fourths of the range areas, and a high percentage of the harvested crops. Grass usually represents the principal and cheapest feed

of beef cattle. Pastures can be regarded as a costly source of feed only on highly productive farm land, but their use in rotation with cultivated crops on such land is certain to continue and be expanded as a sound practice.

About 12 billion pounds of dressed beef and veal was produced in the